

## Neutron Flux Measurements at the LBNL Neutron Facility\*

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The LBNL D+D neutron generator has produced a sustained neutron flux  $>10^9$  n/s. It is currently surrounded by 30 cm of polyethylene that serves as both moderator and shielding. Calculations have been performed with the MCNP neutron transport code to determine the optimum moderator thickness for the highest neutron fluence at the target position for prompt (PGAA) and delayed (NAA) neutron activation analysis. The fluence was also measured at various depths in the polyethylene moderator by activating copper in U.S. pennies (95.0%) and counting the  $^{66}\text{Cu}$  ( $t_{1/2}=5.1$  m) 1039-keV gamma-ray activity. These measurements were performed axially beginning  $\approx 25$  cm from the generator's Ti target. Figure 1 shows a comparison of the experimental neutron fluence

with MCNP calculations. The MCNP calculation was normalized to the neutron fluence measurements and corrected for a significant epithermal contribution. These results are consistent with a generator output of  $\approx 10^9$  n/s, from the MCNP calculation. Separate total flux calibrations with a standard Pu/B source gave similar results.

### Footnotes and References

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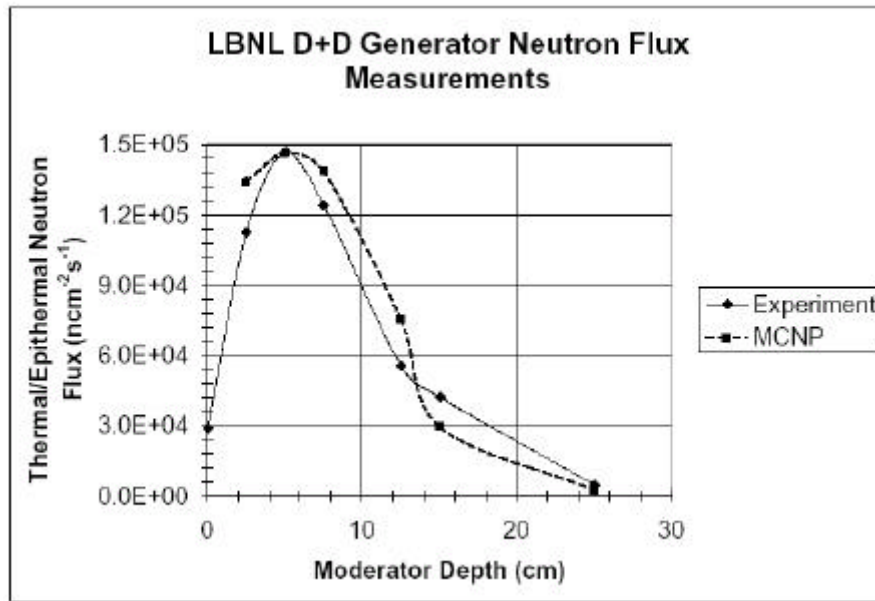


Figure 1. Comparison of calculated and experimental neutron flux at various depths in polyethylene moderator surrounding the LBNL D+D neutron generator.